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CLAIMS

1. Linear actuator comprising a brushless multiphase synchronous electric motor (2) including a stator (3) and a rotor (4), the latter acting on a control organ (O) through driving means (5) designed capable of converting, over several revolutions, its rotational movement into a linear displacement, characterized in that :

- it includes springy and/or magnetic restoring means (21) designed capable of systematically restoring the control unit (O) into a reference position in the event of interruption of the power supply to the motor (2) ;

- the motor (2) includes a position-detection device {25 ; 25A) contributing, in combination with an electronic control unit, to the control or the adjustment of the position of the rotor (4), hence of the control organ (O) ;

- and with the driving means (5), designed capable of converting the rotational motion of the rotor (4) into a linear movement, is associated an independent reversible reduction device (43).

2. Linear actuator according to claim 1, characterized in that the springy and/or magnetic restoring means (21) are in the form of at least one springy and/or magnetic element (22) for controlling the rotation of the rotor (4) designed capable, by an action on the latter, of restoring the control organ (O), starting from any position previously imparted to it by the motor (2), into said reference position.

3. Linear actuator according to any of the preceding claims, characterized in that the springy and/or magnetic restoring means (21) are defined by a springy and/or magnetic element (23) designed capable of acting directly on the control organ (O) in order to restore it, starting from any position imparted to it by the motor (2), into said reference position.

4. Actuator according to claim 1, characterized in that the springy and/or magnetic restoring means (21) are defined in the form of a combination of a springy and/or magnetic element (22) for controlling the rotation of the rotor (2) and of a springy and/or magnetic element (23} acting directly on the control organ (O), this so as to restore this control organ (O) into a reference position, starting from any position previously imparted to it by the motor (2).

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5. Linear actuator according to any of the preceding claims, characterized in that the driving means (5) designed capable of converting the rotational motion of the rotor (4) into a linear movement are designed of a reversible type.

6. Linear actuator according to any of the preceding claims, characterized in that the driving means (5) designed capable of converting the rotational movement of the rotor (4) into a linear movement are defined by a screw and nut system {14), the rotor (4) including, at the level of an axial bore (15) a nut (16) engaged with a coaxial threaded rod (17 ; 17A ; 17B) designed capable of defining, directly or indirectly, the control organ (O).

7. Linear actuator according to claim 6, characterized in that the nut (16) carried by the rotor (4) is mounted moveably on a fixed threaded rod (17B) so as to be capable of moving, according a helical motion, under the stator (3) and of transmitting its linear displacement to the control organ (O) immobilized in rotation by adequate means.

8. Linear actuator according to claim 6 or 7, characterized in that the screw and nut system (14) is of the ball screw type with low friction coefficient.

9. Linear actuator according to any of claims 1 to 5, characterized in that the driving means (5) designed capable of converting the rotational motion of the rotor (4) into a linear displacement adopt the form of a system (14A) of the type roller (40) and cam (41), the roller (40) associated with the control organ (O) evolving along a circular cam (41) put into rotation, directly or indirectly, by the rotor (4).

10. Linear actuator according to any of claims 1 to 5, characterized in that the driving means (5) designed capable of converting the rotational motion of the rotor (4) into a linear displacement include a first cam (41) and a second cam (41A) with crossed profiles designed capable of being rotated with a differential speed, in order to impart to a roller (40A), in the form of a pin, an axial sliding capable of causing the translation of the control organ (O).

11. Linear actuator according to any of the preceding claims, characterized in that the detection device (25) consists of magneto-sensitive elements, such as Hall sensors (26), integrated into the stator (3) of the motor (3) so as to be capable of detecting the magnetic poles (7) of the rotor (4).

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12. Linear actuator according to claim 11, characterized in that the detection device (25A) consists of a linear position sensor (27) associated with the control organ (O).

13. Linear actuator according to any of the preceding claims, characterized in that the motor (2) comprises a rotor (4) including N pairs of rotor poles (7) radially magnetized in an alternate direction, N being greater or equal to four, while being different from a multiple of three, the stator (3) including Px9 identical poles (8) spaced apart by 40°/P, said stator poles (8) being grouped consecutively three by three, so as to define a W-shaped circuit, grouping three consecutive stator poles (8) the central stator pole of which carries the coil (9) of the corresponding phase (10), said central stator poles (8) of two W-shaped circuits, each corresponding to a phase, being angularly spaced apart by 120°.

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14. Linear actuator according to any of the preceding claims, characterized in that the motor (2) comprises a rotor (4) including N pairs of rotor poles 7 radially magnetized in an alternate direction, N being greater or equal to four, while being different from a multiple of 3, the stator (3) including Px9 identical poles (8) spaced apart by 40°/P, said stator poles (8) being grouped consecutively three by three, so as to define a W-shaped circuit, grouping three consecutive stator poles (8) the central stator pole of which carries the coil (9) of the corresponding phase (10), said central stator poles (8) of two W-shaped circuits, each corresponding to a phase, being angularly spaced apart by 120°.